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II. *A Letter from Mr. Ant. Van Leeuwenhoek, F. R. S. containing his Observations upon the Hair mentioned in the foregoing Letter, &c.*

Delft, Nov. 22. 1707.

Honourable Gentlemen,

IN your Letter of the 24th of *October* last there was inclosed a small Lump of a hairy Substance, which was discharg'd by a Woman about 50 Years old or upwards, after she had taken a Dose of *Spanish Flies* given her for an Ulcer in the Kidneys.

I viewed part of the hairy Substance thro' a Microscope, and judg'd it to be the Hair or white Wooll of a Sheep; which Wooll was broken into such small or short Particles, that some of 'em were no longer than six Diameters of the breadth of a Hair; which I suppose could not proceed from the Body of a Man, but that it was rather found in the heel of ones Stocking. And the oftner I repeated my Observations, the more I was confirm'd in my Opinion; for I could not only discover the short broken woolly Particles, but I saw also a great number of the Ends grinded to pieces as it were; insomuch that not only the Bark (if I may so call it) or outside of the woolly Particles were rubb'd off, but the inward little Hairs, of which the Wooll is compos'd, were so divided from one another, that they appeared with their ends like little Brushes.

More-

Moreover under the said Stuff or white woolly Parts, there lay very small Particles composed of exceeding slender little Tubes or Pipes, which I look'd upon to be small bits of Straw, and they were so small, that one grain of Sand cou'd cover 'em ; there were likewise other small Particles of the same figure, but I did not take them to be Straw, but rather the outmost Husk or Skin of a Grain of Wheat or Rye ; and under those I saw one Particle cover'd all over with small Hairs, such as we see at the top of Wheat or Rye ; as likewise some few little bits of Wood, somewhat thicker than a Hair of ones Head : there was also a small Particle of the outmost Skin of a Man, for I could see the little Scales of which our outmost Skin is composed very plainly ; Now these Particles that were not Wooll, might be very easily brought into the Stocking, in case one sets ones bare Foot upon the Floor before one puts it on.

There lay moreover in the said Matter an unspeakably great Number of exceeding slender long Particles, which I imagine to be those hairy Particles, of which a little Fibre of Wool (setting aside the Bark or Skin of it) is composed ; as also several earthy Particles, which I took to be part of the Dirt of the Floor or of the Foot itself.

There also lay a great many particular little Figures, which I could not discover what they were ; and these last mention'd Particles were so strongly joyned to some little Hairs or Wool by the perspired viscus Matter from the Foot, as I suppose, that I could not separate 'em but by the help of some Water : amongst others I also saw two slender Particles lying, which I should likewise have taken for the outmost Skin of a Man, were it not that they were larger than any of the Scales that I could ever take from my Skin, which are mostly of an equal thickness, wherefore I gave over this Thought. In short there appear'd to my Sight so many and such particular Figures, that there was no Account to be given of them ; only I

observed amongst 'em one small Particle, not of a single Feather, such as it appears to our naked Eye upon the Body of a Bird, but rather of the finest Down; and the more I unravell'd or separated the Particles of Wooll from one another, still the greater reason had I to judge, that the Person who had worn the Stocking had been used to go often bare-footed upon the Floor.

Now supposing that these woolly Particles might have fallen into any Spoon-Meat thicker than ordinary, the Person might swallow it down without being aware of it; and if this had happened in some Countries, 'twould have been recorded for Witchcraft.

Now my reasons for guessing that these woolly Particles should come out of a Stocking, and that that should be occasion'd by the motion of the Foot, are these that follow: I my self always wear heavy white woollen Under-stockings, and I lye in the same; insomuch that I can wear 'em three Weeks together, because I am not inclin'd to sweat in my Feet; now having several times view'd the broken woollen Particles which lye in a heap as it were cleaving together under the Heel, and having also singled out of them several Fibres or Threads of Wooll, to prove that they are compos'd of little Hairs, and these woolly Particles exactly agreeing with those that were sent to me, I could no longer doubt that the said woolley Particles that were so sent to me, were any ways different from those Particles that were found in the Heel of the Stocking; 'tis true that amongst the woolley Particles of my Stockings I never met with any Wood or Straw, but the reason of that was, that I have not touch'd the Ground with my naked Feet for some Years, being unable to bear any Cold in my Feet; nay so far that in the Nights, even in the Summer time, I put a Tin or Pewter Bottle filled with warm Water to the bottom of my Feet, by which means I preserve my self, as I fancy, from that Plague called the Gout.

About

About a Year ago I had in my House the Gut of an uncommon great and fat Cow, a part of which I blew up, but not much, lest the Membranes of it should be too much extended, but I made no Draught of that Observation; but I imagined that I observed one Membrane of the same in which there lay abundance of little Fibres, length-ways, and very regularly one by another; and in another Membrane in the same place, lay other Fibres cross-ways, that ran from the Centre to the Circumference of the Gut; from which Observation I suppose that that motion which we see in the Guts, as soon as they are taken out of an Ox, is the motion that Nature uses, to protrude, and discharge the Chyle out of those Parts.

I also took the Bladder of that Beast, and blow'd it up as big as two common Fists, to the end that I might better separate or distinguish the Membranes of it, and so let it dry; and having cut it through at about two Fingers breadth from the Neck, I judged that there were twelve Membranes lying one above another, and I put the Microscope (before which a little piece of that Bladder was placed) into the Hands of a Person that stood by, desiring him to observe how many times double he saw the said Membranes lye, who told me he also observed 12 of them: I was likewise of opinion that some of those Membranes were divisible into two, to the end that the Bladder might be extended into a larger space.

Antony van Leeuwenhoek.